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THE JOURNAL OF PHILOSOPHY

THE *X* AND THE *Y* OF PSYCHOLOGY—I

I

IN the physicist's world of quantity, his world of measurable mass and movement and momentum, his world of quantitative content and quantitative behavior, is there room also for quality? Is nature itself wholly quantitative, or is it also qualitative, as the experience of the race, in however mythical terms, has so consistently testified? And if, then, it be also qualitative, how shall we conceive of its qualitative aspect, and how conceive of the relation between the quantitative and the qualitative? The answers to these last two questions constitute the *X* and the *Y*, respectively, of present-day psychology, and the means of bringing the mentalistic and the behavioristic "psychologies" to terms with each other.

At the outset let us consider two different kinds of fact which we designate with this one vocal gesture "quality," and so let us narrow down our problem to its bare essential statement and data.

First, consider two apples, one sound, the other rotten. We say that they differ in "quality." But the difference here indicated, between external existences themselves, the chemist and physicist declare that they can resolve into one of nothing but moving masses, into one of nothing but differences of content and behavior. It is wholly a quantitative, measurable difference.

But, second, these two local concentrations of differing masses exhibiting differing modes of behavior do not constitute what we call our "experience" of the apples. A conscious experience, a sensation of color, taste, smell, or pressure, a quality of our contact with the apples, is not a mass or any conglomeration of masses, either external or subjective, either at rest or in motion. Nor can the chemist and physicist in any way reduce it to quantitative terms, whether static, dynamic, or motive in their reference. Measurement of natural things does not transform or reduce them to the terms or the realm of the units of measurement. Physics does not transform the natural into the physical; it only discovers and exhibits nature's measurable aspects, and that by means of arbitrary, conventionally accepted units of measurement. Physics is not nature,

but a humanly created system or realm of measurements which we appreciate in terms of our own nature. "Man is the measure of all things." A physical thing is by definition a measurable thing; "physical thing" and "natural thing," whether the "thing" referred to be existential or occurrential in status, are by no means synonymous terms of reference, if we think accurately. Nor indeed is "material thing" synonymous with either. Physics measures more than masses, and nature in any moment exhibits more than the merely existential. There are realities of occurrential, as well as of existential, status. This is a distinction that will appear throughout our argument. Physics measures in both fields; but our immediate concern here will be with facts of occurrential status, and with two kinds of character that they exhibit, physical and psychical.

However completely we may subject the things and events of nature to measurement, they do not *become* units of our measurement. They still have their natural, objective status, as existential or occurrential, however completely we become enabled to exhibit to ourselves the character of that status, in terms of our own nature and behavior. And so it is with the qualitative or psychical. An external "thing" can never be absorbed and lose its existential or occurrential identity within the terms or content of experience; an experience referred to an external thing or occurrence never absorbs or becomes that identical thing or event. Experience, which is as natural as nature itself, tells us that the natural world is qualitative as well as quantitative; it tells us that quality is an equally natural and real, an equally ultimate and primative datum, with quantity. But it does not tell us whether quality *as experience* is directly referable to things of existential status or to facts of occurrential status; that is left for us to find out. Meantime, we had better say that the natural, including ourselves, is the primitive or real datum, and that out of existential and occurrential nature we have become able to measure some of its data as "physical," and to experience or appreciate some of its data as "psychical." But we may be sure that no amount of regressive, refining analysis in terms of the two series, quantitative and qualitative, or physical and psychical, will ever conclude and coincide in an identical ultimate, or "metaphysical" element. Here is a point at which monistic evolutionism, both "materialistic" and "spiritualistic," has been badly overworked.

As already indicated, we here intend to assert two kinds of natural status, existential and occurrential, to which the fundamental realities are referable; and we intend to assign quality as a character of the occurrential, as also quantity in a limited way; for

it is obvious that existences and movements are no more truly measurable than are coöperative occurrences—for example, impacts—therein involved. Within this occurrential sphere the physical, quantitative, or measurable, and the psychical, qualitative, experiential, or appreciable, are thus two natural aspects or characters of the same kind of thing—a limited kind of thing, so far as the physical is concerned; an occurrential, not existential, thing; a "fact," in the literal sense of the word. Within this sphere the physical and the psychical are two kinds of character, absolutely discrete in identity, as are the height and the honesty of a man; and yet they are not independent of a common occurrence, and hence not wholly independent of each other, and hence not wholly incommensurable. Behind both and exhibited in both, but in very different ways, though each is in mechanistic conformity with the natural fact itself, is that natural occurrence, in its own status; and physics and psychics are two human ways of understanding and appreciating the fact itself and making knowledge of it usable for human purposes in relation to other facts that are similar. We can neither measure nor appreciate the fact until it occurs, and hence neither our measurement nor our appreciation of it can have any influence towards changing it. Furthermore, as this kind of fact is both quantitative and qualitative, physical and psychical, at the same time, we can hardly expect either character to be interpretable *in terms of* the other, a point upon which we have already dwelt. Rather, we ought to expect them co-operatively to throw light upon our understanding of the fact itself. Our understanding of each may possibly be improved *by reference to* that of the other, but that is a very different matter from translating and understanding either *in terms of* the other.

Wanted, then, a conception of the natural world, especially of its occurrential facts and their quantitative and qualitative characters, that attempts neither to reduce the qualitative to the quantitative, as the physicist has tried to do, nor the quantitative to the qualitative, as the metaphysician has tried. Wanted, a conception of "mind" that will allow to it and to all that appertains thereto a perfectly natural status, with all the objectivity of other natural realities, both existential and occurrential.

This is, in effect, to assert that neither physicalism and behaviorism nor psychism and introspectionism can be all of psychology, but that the truth of the matter includes both extremes. Behaviorism and introspectionism, objectivism and subjectivism, must come to terms with each other, each recognizing the reality and naturalness of the data with which the other deals. For this we require, first, a

conception of quality that will allow to it as clean-cut and objective a reality as we allow to quantity; and, second, a definite, mathematically statable conception of the relationship that subsists between these two supposedly ultimate and discrete kinds of data of the natural. In other words, we wish a strictly objective conception of the nature of the psychical and of its relation to the physical —of both the *X* and the *Y* of psychology. And be it remembered that we are here immediately concerned with the quantitative or physical only in relation to that natural factual status which we are denominating as occurrential.

II

First, I shall present an hypothesis for such an objective conception of quality. Then I shall proceed to apply it to an interpretation of the three traditionally differentiated kinds of conscious experience—sensation, emotion, and feeling or affective tone. All three of these we shall subsume under a single principle, as "sensation," thus acting in harmony with a current tendency common to both mentalism and behaviorism.

But our notion of sensation will not be the traditional naïve and mentalistic one, of a "sensing" of the "qualities" of the stimulus that impinges upon our receptors. We do not think of "sensory qualities" as revelatory of the content or nature of the stimulus or external existential thing—chiefly concerned with visual experience —which the idealistic philosophy has confused, as "object," with the image, perceptual and ideational. These two realities, existential thing or ultimate stimulus and sensuous or experiential "object," have an entirely different status, one from the other; and also a different locus, both spatial and temporal. The immediate, occurrential stimulus itself, as such, by the time the "object" occurs, has gone "into eternity"; a temporal, neural process has intervened between its occurrential moment and that of the "object." In the case of a retinal or a tympanic stimulus, there has intervened a temporal, extra-organismal process, ethereal or aerial, respectively, between the thing itself that is naïvely supposed to be "sensed," and the actual, immediate stimulation of the organismal receptor. And in the case of vision, even the distant, existential thing that is supposed to be seen—even this is an actually different thing in the two instants of its setting up the ethereal commotion and of the immediate retinal stimulation by this imparted commotion; and it is a still different thing at the instant of the occurrence or "experience" of the "object." Its identity or "existence" at these three moments is in each case a temporally or serially different complex of behavior

movements or positions. Certainly, if there be any truth at all in the physicist's exhibition of the *conditions* of experience, there is a marked difference of locus, both spatial and temporal, between the efficient stimulus and the experiential "object." And we shall hold, also, that there is a difference of natural status between the two —such a difference as that between a natural fact and one of its characters.

The qualities, or qualia, or content of conscious experience, then, we shall consider as being neither physical nor psychical nor mental. First, they are not physical, because they do not constitute any portion of the subject-matter of the science of physics; they can not be measured by any of the units, or described by any of the categories, of physics. Second, they are not psychical, in the theological, metaphysical, or mystically existential sense traditionally held of them. Nor, indeed, are they psychical in a sense analogous to that in which we use the term "physical." Our psychics has not yet in any way attained to the rank of a science; it has as yet an anomalous, mythical status in no discernible way connected with any kind of physically describable thing or event. Our psychology is a conglomerate of both physics and this mystical psychics. Our nearest approach to a scientific psychics is contained in the "psycho-physics" embodied in the Weber-Fechner law. But even here we have as yet no clear comprehension of either the quantitative or the qualitative "facts" whose relation is there expressed; that is to say, we have not yet identified the natural facts whose quantitative and qualitative characters constitute those quantitative and qualitative "facts." And, third, the qualia of experience are not mental, as constituting a knowing content, directly substitutional by nature for the "thing sensed." A knowing is an act, describable in terms of stimulus and response, or of receptors and effectors and their intervening mechanisms. As directly mental or knowing phenomena, the qualia of experience are revelatory only of occurrences within these mechanisms, occurrences incident to the dynamic adjustment of organism to environmental occurrences, through the agency of a neural current. Moreover, from the standpoint of physics these qualia are so much "velvet," involving no expenditure of momentum or "energy" on their own account; for they are only characters of occurrences that do involve such expenditure. And, finally, there is another sense in which they are neither psychical nor mental, in the traditional sense. They occur in external nature, both organic and inorganic, as well as in the human organism; and in both cases they are as objective, both spatially and temporally, as are masses that move. This we say, because the occurrences of which they are char-

acters are thus objective, being occurrences in which objective masses share. They do not depend upon a nervous system, synaptic or otherwise, for their occurrence; and hence they are not necessarily confined, in range or occurrence, within the sphere of organismal "experience" of whatever kind, or of all kinds taken collectively.

It is true that qualia which occur in external nature have no means of communicating themselves to us; nor have we any means of apprehending or detecting them as they occur. My assertion of their occurrence is purely hypothetical. My conception of their nature and objectivity is itself dependent upon my hypothesis of the nature of the subjective qualia of experience, which it was formed to illustrate. My only direct evidence for asserting the occurrence and reality of external qualia is the fact that qualia do occur within experience—or, rather, *as* "experience," under what are apparently exactly homologous conditions. I hold that externally and internally occurring qualia are exactly homologous in character, though not necessarily of the same kinds or serial ranges. My argument for their occurrence and character will at first appear to involve a bold *petitio;* but the obviousness of my objective illustrations I trust will lift the argument above the circumference-baiting *petitio.* I trust also that it will furnish the suitable analogy which the holders of the double-aspect theory of the "mind-body relation" have long been requiring, though I consider it more strictly an homology than analogy, and as referring to things of occurrential, rather than of existential, status.

If there be any merit in my hypothesis, it will be found to consist in my endeavor to take the new physics seriously; in the effort to get away from the old-time static, spatio-temporally existential conception of the "material" or "physical" as the only kind or type of natural reality, and hence to conceive even of existential nature under the dynamic form of behavior. I am emphasizing the reality of natural occurrences as strongly as that of natural masses and their behavior. Such occurrential status is just as truly natural and real as is the existential status of things that participate in the occurrences, and it is to this status that we assign all the "conscious" or qualitative phenomena of "experience." The new physics suggests that we altogether renounce the effort to find an analogy of the psychical in the mass or static, existential imagery of the older materialism, as, for example, in either a "surface-mass" or a "convex-concave" relationship. In the new physics the temporal takes precedence over the spatial or extensional as exhibiting the nature of existential reality, the dynamic over the static, the functional over the structural, the processal over the merely existent; existence it-

self in any specific form is found to be a function of behavior. Hence the new physics suggests that we look to the sphere of natural occurrences, and hence to some aspect, or function, or character of such natural occurrences, for the elemental constituents of the qualitative or psychical. I suggest that here we shall find a kind of occurrence and a kind of relationship that can not be truly represented by any analogy between any two physical, measurable aspects of existential masses. I suggest that here we shall find a kind of occurrence exhibiting two characters, two commensurables without a single common factor save those of temporal and local identity in occurrence, and yet that these two characters of the same natural occurrence bear such a relation to each other that we may say with mathematical precision, "The more of the one, the more of the other," the relation that is stated in the Weber-Fechner law.

This relation it is that I am calling the "*Y*" of psychology, and I am taking to myself not the slightest credit for its discovery or elaboration. But I have found it a suggestive and valuable aid in the effort to conceive and render plausible a definite notion of my "*X*," and in developing my argument regarding its nature. Then, having apparently found the nature of the psychical, I am enabled in turn to employ this knowledge in interpreting the Weber-Fechner law, that is, in telling what are the two kinds of reality, or reality characters, whose relation it states.

III

The natural datum of which the psychical is an aspect or character, then, I assume to be an event or occurrence. And this occurrence I hold to be a clash or impact or collision between two natural masses.

First, I present my objective homology of the qualitative. Let us suppose two equal and like-shaped masses of several kinds of natural, material substance, for example, rubber, ivory, lead, aluminum, carbon, diamond, and lamp-black, these last three being so many different isomeric organizations of the same kind of natural content. Then let us suppose these masses to be clashed together in paired permutations, rubber upon rubber, ivory upon ivory, *etc.*, rubber upon ivory, rubber upon lead, *etc.*, *etc.*, in all cases at the same velocity. Then the physical, quantitative character of the impact will in all cases be describable in the same mathematical terms. Nor will it be necessary to suppose both masses of each pair in motion; a collision between two masses either one of which is more or less constant in locus will be sufficient for the purpose, provided the sum of the velocities is constant.

But will these impacts be qualitatively the same in all these describably different cases, or even in two? It seems unbelievable that they will—if, indeed, there be such a reality as quality, as our experience declares there is. Moreover, such qualitative differences as occur will apparently be constant in kind for constant masses of the same kinds and organizations of content, even throughout the entire gamut of regressive analytical division and refinement, as far as galactic differences appear. Qualia are as mechanistically determined and exhibited as are occurrential quanta, both being characters of the same mechanistically describable event. It is true that in such gross, perceptible masses as are used here for illustrative purposes, there would be inner clashes and hence inner quanta and qualia, within each of the colliding masses. Our illustration is only an illustration, and a gross one at that; and yet we hold that it presents a strict homology with the conditions and elements of consciousness or the mental, namely, sensation, emotion, and feeling.

Let it be carefully noted that we are not saying that the qualia of impacts are anything in addition to the impacts themselves, any more than are their quanta. The quanta and qualia of impacts are but two characters which they exhibit. In a similar way, the area of a triangle is "there," whether or not we measure or compute it. And so also is its form "there," whether or not we appreciate it. Area and form are two essential characters of a triangle as such, determined by the fact that the thing is a triangle. And so, we hold, are quantity and quality essential characters of an impact as such, determined by the occurrential fact itself of impact. Our analogy holds even further than this. As the area and form of a given triangle—one of definitely describable sides—are mathematically related, so also are the quantum and quale of a given impact—one involving definitely describable masses and velocities.

Now, note another aspect of the case. It is easily conceivable that a given quale may vary in intensity with a difference of velocity and hence of momentum on the part of the clashing masses at the instant of impact. But it does not appear that this variation in qualitative intensity will be directly proportional to quantitative variation of the occurrence. For example, it does not seem that all, or possibly any two, kinds of masses, even of molecular, atomic, or sub-atomic galaxies, will "stand" the same quantitative range of impact. In a gross way an apple, an orange, a billiard ball, and a cannon ball will illustrate the case; or a snowball at different densities and temperatures. Moreover, it may well be that the impact must be of a certain quantity, differing specifically for different kinds of masses, in order to exhibit any sort of specific quale. It is

conceivable that there are threshold and lintel limits of objective qualia, as there are of subjective, mental, or conscious qualia.

Assuming, then, that qualia are natural facts, as functions of our supposed masses in the relation of impact, and, therefore, as characters of the impacts themselves, we may infer that, for a series of quantitatively different impacts between the members of each of our permutative pairs of masses, there would be a sort of logarithmic correspondence of qualitative intensity. We may infer also that this relationship would vary from one to another pair thus put through the same quantitative series of impacts. All this, I suggest, is an exact homologue of the nature of our conscious experiences and of the "psycho-physical" relationship as expressed for the several "senses" by the Weber-Fechner law.

Another interesting observation may be made. In the homologues here employed for illustrative purposes, it is obvious that the quale of the impact has no influence or efficacy upon its quantum. Both are exactly synchronous and coincident characters of the same fact, and this whether the fact occur in external and even inorganic nature, or as a neural occurrence within a synaptic nervous system, where it is "known" only as a quale of consciousness. In other words, consciousness of a fact can have no influence upon that fact itself, though the fact may have a highly efficacious influence upon succeeding facts and upon the behavior in which they are involved as incidents.

And yet another observation is here suggested. As the quale of an impact can influence neither its own impact nor the quantum of that same impact, so neither can it influence another impact or its quantum, whether that impact be either synchronous or successive. If this be granted as true—of course, with all proper reservations of doubt and readiness for new cues—then it seems that no patterned occurrence of qualia, either synchronous in occurrence but spatially diffuse, or successive and temporally diffuse in occurrence, can in the slightest degree possess any efficacy, "psychological" or otherwise—any direct efficacy upon behavior. That is to say, an "image," "constituted" of such a pattern of occurrential qualia, can in no way serve as a cause or motive of action. All psychological efficacy resides in the mechanistically selective and integrative mass behavior of the natural serial mechanisms of stimulus and receptor, receptor and conduction unit, conduction unit and effector. When we speak of an image or idea as having efficacy, we must have primary regard for three things: first, the organized conduction unit, and especially its pattern of relative discontinuities in the cortical synapses; second, the patterned receptors, with their specifically

selected stimuli, outside this conduction unit, which means outside the brain itself; and third, the current of neural commotion, by which receptors and effectors are kept in dynamic communication. The image and idea, in the traditional, partial sense of a mere character-complex of intra-neural impacts, are but so much "velvet" incident to mass occurrences within an organized, patterned unit of conduction, the organization of this unit itself being the thing that is "retained" in habit and memory. In the sense of their full reality an image and an idea are acts, in which both stimulus and organism as a whole participate.

And if an image and idea, in the traditional sense, must thus be denied efficacy, so also must sensation, emotion, and feeling. In their full reality these also are acts. Such a notion as that of mental, psychical, or "spiritual" "energy," if it have regard to anything other than the natural, "massive," "physical" flow and momentum of a current of nervous commotion, is pure myth. So also is any notion that human behavior, human character, or human personality has its motive and foundation in "psychical" feeling, emotion, or passion, and not in materially efficacious, massive stimuli and massive behavior mechanisms that response to these has organized and built up.

For the psychical is not an existential, but a functional category, and functional not of existential, but of occurrential facts. The psychical as such is wholly dependent. It waits, for its occurrence, upon the behavior of masses, and for its kind, upon the specific kinds of masses that coöperate to produce it. In thus saying that the behavior of natural masses produces the psychical, what I mean primarily is that this behavior produces impacts as natural realities, and that these impacts have as one kind of character the physical, and as another kind, the psychical. This is not to say, as some might at first infer, that all efficacy resides in a physical character, or "side," of the impact. The impact itself is the efficacious fact, its efficacy being dependent upon the momenta of the colliding masses. Its quantum and the factors that determine it are subject-matter for the science of physics, which the science describes with, but does not reduce to, the categories of physics. Its quale and the intensity of that quale are subject-matter for a science of psychics. Psychics as a science—if there be need of such—will consist in identifying and describing the qualia of experience by indicating the kinds of masses, with their respective velocities and consequent momenta, that coöperate in producing the impacts whose occurrence is appreciated as consciousness or "experience." Psychics will thus be dependent upon physics for much of its data. But this does not

mean that the psychical will be interpreted "in terms of" the physical, nor that psychics will become a branch of physics. The two will be as independent of each other as are physics and chemistry, physiology and psychology, or sociology and economics.

Now all this disquisition regarding qualia, even the assumption of their occurrence and reality, is purely hypothetical. Nor is the hypothesis itself an outgrowth or a subsumption of previous efforts to understand the psychical—save in relation to a notion of neural resistance, to which the experience of feeling has been occasionally referred.[1] The hypothesis, as a means of conceiving the nature of this resistance, is pure invention, made outside the stream of historical psychological endeavor, and hence in some quarters may be subject to immediate condemnation out of hand. Yet it is largely in such ways that the better established sciences have been advanced, and why should not psychology try the same course? The test of my hypothesis is not to be made by appeal to history, that fetish of conservatism, that magic wand of justification of the liberal, that deposit of habit organized in response to unidentified stimuli, but by appeal to its fitness to explain the data that require explaining. It is the history of the future, the consequences of application of the hypothesis to more and more highly refined and differentiated stimuli, that must be our judge and jury, and to their verdict we submit, "without one plea."

My case stands or falls with the presentation thus far made. My hypothesis is one that must sooner or later occur to some interested person, and hence I can claim little credit for it, if it prove more or less valid in the sequel. On the other hand, if it prove null and void, mere moonshine, my effort may save some one else the loss of time and effort, and the humiliation that will be mine. In either case, I recognize the law of social coöperation as the law of life and seek to abide by it. We shall next turn to the application of this simple hypothesis in an effort to explain the several kinds of experience that make up our varying and shifting consciousness.

(*To be continued*)

ORLAND O. NORRIS.

YPSILANTI, MICHIGAN.

[1] *Cf.* Harvey, N. A., *Elementary Psychology* (1914), Chapter XV, and the quotations from other authors appended thereto; also, *The Feelings of Man* (1914), by the same author. Dr. Harvey has made the furthest advance that I know of towards a consistent presentation of the physically statable conditions of feeling.

IS THERE MATERIAL SUBSTANCE?

IN what follows we shall mean by material substance a solid stuff occupying a volume. Let the notion be taken at first in the vague way of common sense; we hope to give it a more precise meaning as we proceed. Throughout we shall use material substance, stuff, and matter as synonyms.

To a philosophical demolition of material substance we have long been accustomed. The like is true, indeed, of cause, of purpose, of chance, self, soul—of many if not most of the categories esteemed by a naïve metaphysic. Such a procedure the history of thought teaches us to discount; for if one school dissolves purpose into mechanical causation, another analyzes cause into purpose, and if one reduces matter to self, an opposing school reverses the reduction. To an impartial observer it is not apparent that one party has a decided advantage over another. But of late the scene has changed a little. Certain results obtained in the field of physical science have been claimed as decisive. Thus, it has been urged that the electrical theory of matter, now pretty well established in physics, has removed all ground for belief in material substance.[1] In other directions, too, has appeal been made to doctrines of physics in support of philosophic partisan views. The theory of relativity has recently been invoked by three philosophers of note, *viz.*, Bergson, Carr, and Haldane—as had already been done by Natorp in 1910,—to justify the several metaphysical views of these writers; views which can not be regarded as those of one school, or even as mutually consistent.[2] Now, while this growing tendency of philosophers to respect science is highly desirable, the discordance of the result shows that the meaning of the testimony of science is not so unambiguous as one might hope, and a degree of caution is to be recommended. Before building a philosophy upon scientific deliverances, let us be reasonably sure as to what the deliverances are. It may well be that these do not destroy, but rather strengthen and clarify the categories which common sense has for ages found useful in thinking about and dealing with the external world. And in the present paper we propose to ask whether the electrical theory of matter implies the discarding of the notion of material stuff, or its retention.

The first impression of that theory upon the lay mind is certainly that it has the former implication. The chemical atoms are no

[1] *Cf.* L. Rougier, *Philosophy and the New Physics* (trans. by Masius), especially pp. 62–72.

[2] Bergson, *Durée et Simultanéité;* Carr, *A Theory of Monads;* Viscount Haldane, *The Reign of Relativity;* Natorp, *Die Logischen Grundlagen der Exakten Wissenschaften.*

longer conceived as little balls of matter, but as systems of electrons and protons; these being negative and positive charges respectively. They have no mass in the mechanical sense, since all their inertia is of electromagnetic origin; that inertia is completely accounted for by the pull of the electromagnetic field backward upon the accelerated charge. And consistently with this it is proved that the mechanical mass of a large moving body—a cannon-ball, say—is wholly electromagnetic. Moreover, it is found that mass varies with speed. One and the same body, or one and the same electron, has a greater mass when it has a greater velocity. How then, it is asked, can mass belong to the material stuff of electron or body, since this stuff would always be the same? So, it would seem, physics has demonstrated that there is no such stuff in electron or body. Not only does physics not use the notion of stuff; it finds a property—varying mass—which seems to be inconsistent with that notion. The real beings of the material world are then charges and their fields. And when we recall that a charge is a relation, *i.e.*, a repulsion or attraction of another charge which is itself a repulsion or attraction of another, we see to what sort of a position we are being led. The whole material world is but a system of relations without terms; for the terms (electrons and protons) vanish into relations. Idealistic criticism used to tell us that matter was an abstraction, taken as real from the abstract point of view of science. Now we seem to learn that it is not even an abstraction; it is not a term at all, but a relation between relations . . . . *ad infinitum*. The scientist himself has discarded this pretended abstraction.

The interpretation here presented may be illustrated by the words of M. Louis Rougier, who is an opponent of the old dualism of material substance and energy, and would reduce external reality to energy alone. Speaking of the cathode particles, he says: "These particles constitute elementary electric charges without material support, atoms of negative electricity called electrons. Thus we have here, contrary to the dualistic theory, a *form of energy, resinous (negative) electricity, that appears to be endowed with inertia and corpuscular structure without any material substratum.*"[3] According to this author, science has brought about the "dematerialization of matter" (p. 62). And again: "To sum up, a moving electron appears to us as a circumscribed region of space, where there is to be found accumulated electromagnetic energy in the form of fields, the intensity and distribution of which vary as a function of the velocity. The mass of an electron cannot be attributed to a material support that does not exist . . ." (pp. 71–72). Of like import are

[3] *Op. cit.*, pp. 57–58.

the words of a writer [4] in the *Scandinavian Scientific Review:* "The 'world' of earlier physics was a world in time and space, a world of moved mass-particles, of vibrating molecules, atoms, and electrons. The 'world' of [the] new physics is wholly unobservable." Also "the real is not described through a *thing,* but through a series of relations between geometrical dimensions." [5] It is "not a reality of things, but one of laws and relations." [6] And in this connection we recall a sentence of Eddington, discussing the general theory of relativity: "we need not regard matter as a foreign entity causing a disturbance in the gravitational field; the disturbance is matter." [7]

Now, most of us had thought that relations are meaningless without terms; that there can not be motion without something that moves, and that a system of nothing but motions or relations is a vicious circle. To minds of a moderately conservative habit the picture which the electrical theory of matter is alleged to draw is only to be described as shocking. It seems to offer in place of external reality an impossible illusion. To the philosophical radicals, on the other hand, the picture is pleasing; partly on account of its novelty and partly perhaps because it disturbs the complacency of the old-fashioned. Leaving emotional reactions aside, however, we have to ask whether the new results do really prove that there is no material stuff in the external world. The proof, if such it be, appears to be drawn from two considerations: first, that electromagnetic inertia suffices to account for the mass of an electron (or proton) and second, that mass is a function of velocity. Let us take these up in turn.

The mass of an electron consists wholly of its electromagnetic inertia. In the Newtonian mechanics inertia was supposed to reside in the substance of the body that possessed it; but electromagnetic inertia is quite different. It is the pull backward on an accelerated electron, the pull being due to the action of the field surrounding the electron. The field is conceived as non-material and filled with lines or "tubes" of force. Whether these "tubes" are strains in an ether we need not ask; enough that the pull backward on the accelerated electron is ascribed to the field acting on the charge of the electron. Thus the conclusion is reached that the electron is not made of stuff, but is only a disembodied charge.

But that does not follow. There might be stuff occupying the volume of the electron, on which stuff the field acts when it pulls

[4] H. K. Schjelderup, "The Theory of Relativity and its Bearing upon Epistemology," *S. S. Review,* Vol. I, p. 58.

[5] *Op. cit.,* p. 59.

[6] *Ibid.*

[7] *Space, Time and Gravitation,* p. 190.

back the electron. To be sure, the quantity of electromagnetic retardation is a function of the electron's charge, its radius, and its acceleration, and of no more than these. But there is nothing in this to prevent the charge from residing in a stuff whose only measure is the volume of the electron. Or if the electron is conceived, as sometimes it is, to be a hollow shell, all of whose charge is on the surface, there is nothing to forbid that surface being composed of minute elements or charges, each of which possesses its own substance or stuff of minimal volume. There may not, so far, be any proof that there *is* such stuff; but neither is there so far any ground for asserting that there is *not*. The situation is, after all, logically not very different from that of the Newtonian mechanics. As formerly there was no scientific objection to assigning mechanical inertia to material substance, why should anyone now object to assigning charge to matter? To show cause for excluding substance from the electron, some other argument must be brought up. Probably that argument will be that the substance of an electron contributes nothing to its activities, or shows no measurable effect. If all can be explained by charge and the field, why bring in this *ens praeter necessitatem?* In reply we ask, how do you determine what is necessary? Is it not necessary that a relation is connected with a term? The argument of the conservative is that a charge, being a relation of repulsion or attraction to another charge, must have stuff from which it starts and stuff to which it is directed, or else we are left with nothing but relations between relations, which is unthinkable. And whether this is true or not, it is not ruled out by the *scientific* evidence. The decision is not rendered by the physical theory of electromagnetic inertia.

But the second reason for excluding substance awaits us. It is urged that because the mass of an electron increases when the velocity increases, the mass can not be the measure of a stuff constituting the electron. For the stuff would be as constant as the electron itself, whereas the measure of the mass varies. But if we ask why the mass increases with the velocity, we find that it is because the field surrounding the electron exercises a greater pull backward as the velocity increases. The quantity of stuff, if such there be, may well be invariant; but the action of the field upon that stuff varies with the velocity of the stuff. In the Newtonian mechanics, there was no field surrounding a moving body, and its mass was, therefore, independent of its velocity. But in the electrical theory of matter, electrons are subject to the influence of the electromagnetic field; and while this complicates the value of their inertia, it by no means implies that they do not contain the same stuff

throughout their motion. Again, we must conclude that the evidence of physics does not deny the presence of material substance.

But all this is negative. Does the testimony of science leave the question quite in the air? We can not help asking if there is not some positive evidence on the subject, which justifies belief in the existence of substance. And we are led to do so the more, because the concept of material substance is so far a very vague one. All that we have ascribed to it is the property of filling a volume. But *what* fills the volume? We have scarcely more than a word; and a word seems hardly heavy enough. Is there not then some positive mark which gives content and precision to this rather indefinite somewhat that we call stuff or substance? I think there is such a mark; that its presence is attested by physical science, and that material substance is thus a clearly definable and identifiable entity existing in the external world.

We shall first adduce an old argument which would appear to point out a positive attribute of substance, yet does not go far enough to be decisive; one that may be said to indicate what we seek rather than to provide it. The argument is (put in modern terms) that an electron must contain stuff because it moves continuously from place to place. For the particular volume it occupies at the start of a journey is not the particular volume it occupies at the end of the journey, yet the electron is the same identical electron. Therefore, the electron is not *merely* a certain negative charge in a certain place. It possesses also the property of being the same charge in different places. What, then, identifies it as the same charge? Not the magnitude of its volume or of its charge, for these are the same with all electrons; not the place where volume and charge may be, for these vary with one and the same electron. There is then something, we know not what, which is located always in space yet is not itself a portion of space. This something *fills* a portion of space, or a volume. Of course, in a sense, a volume may be said to fill itself, but clearly "fills" is not here used in that sense.

Yet until we find a positive mark which defines this something, these considerations are quite formal. They give us no better notion of substance than an indefinite *tertium quid*, an implication of thought, a "that which moves." They do not tell us what it is that moves. Such implication may be correct, but it is not sufficient; the demand for clear thinking will, in default of more specific knowledge, urge us to reduce it back to relations of space or motion. So, indeed, the history of the concept of substance has proved. A deadlock or an eternal tilt will then ensue, as the opponents feel dull or lively. In the latter event, the partisan of substance will forever claim that

there is something which the reduction has not quite touched, and the partisan of relations will forever insist that if that substance has any meaning it is definable in terms of space or motion. This is but another form of the old dialectic of subject and predicate. If material substance is to resist dissolution into relations, it must be shown to be more than a subject of predicates. No doubt the philosopher has worked too much *in vacuo*, contenting himself with a formal implication, and disliking to consult the empirical deliverances of physical science which might not fit too well the ideal scheme. But we must consult those deliverances if substance is to mean more than an empty term. They must be shown to reveal a definite and positive property of the electron, which can be interpreted only by the assumption that stuff is present—a property which is, therefore, the *differentia* of stuff.

That property, we shall now urge, has been furnished by observation and calculation therefrom. The electron (or proton) has been found to hold together as one, and to exclude other electrons (or protons) from its own volume. In one word, individuation is what we are seeking: but the notion is a fairly rich one, as we shall see. Had there been no electrons or protons, but only chemical atoms, the same property would have existed in the latter; and if electrons and protons are sometime analyzed into more ultimate parts, it will then hold of these. Whatever be the ultimate atoms, it will belong to them; but as electrons and protons are the ultimate ones today, we shall speak of electrons and protons. Material substance, then, is not general or common to two of these; it is never shared. Space is continuous throughout, but stuff is atomic and discrete. It is this electron or that proton and no other. Such is the teaching of the atomic theory; and atomic theory is the great result, perhaps the greatest result, of empirical science. And this atomic property shows itself in two ways: the electron or proton maintains itself as identical through motion by not being broken up or separated into parts, and by suffering no encroachment from without upon its own content. Let us call these two aspects of individuation the integrity and the exclusiveness of the electron, and let us consider their meaning in turn.

Integrity means that if one part of the volume of the electron or proton is moved, the rest is also moved. It is hereby not a negative property, but is defined in positive terms. It applies, so far as is known, to all forms of motion. As far as evidence is available on the matter, it seems fair to say that there is an immediate effect of the motion of one part upon the other parts; the electron or proton moves as a whole, and no part can move away leaving the rest behind.

The parts are all bound together. Now this means that in regard to the communication of motion from one part to another, they behave as if there were no distance between them, for the motion is communicated across the volume of the electron or proton instantaneously. The parts which are on opposite sides behave as if, in spite of the actual distance between them, they were in contact. Now the only means of securing contact between distant points is that which we call continuous solid stuff. Stuff is in the space-world the tie between different places, the source of rigidity so far as there is rigidity. If two surfaces move together *always*, they are connected by stuff and are surfaces of a solid. True, the chemical atoms contain electrons and protons which under normal conditions maintain much the same relative positions. But not quite the same; the electrons probably oscillate. Also the equilibrium of these systems may be broken down; in the case of heavy atoms like radium, it breaks down spontaneously. The structure of the *ultimate* atom does not give way, however; a solid continuous content is the guarantee of its permanence. Stuff is, then, the binder-together of different parts of a certain volume in unity of behavior. Action at a distance does not occur in the surrounding field; it does in a sense occur within the volume of the ultimate atom. But this does not conflict with the denial of action at a distance which is made by physics; for the presence of material stuff is, as regards the transmission of motion, the annihilation of distance.

The electron is for certain purposes treated as a collection of minute elementary charges on the surface of a spherical volume. As the charges are negative, they repel one another; and the question arises, why does not the electron burst asunder? If the electron is not the ultimate atom, the answer will be found when certain attractive forces are discovered holding these elementary charges together. In that case, these charges will become the ultimate atoms. If the electron itself is the ultimate atom, then it is or contains a continuous material stuff; for its integrity *is* its substantiality. And presumably the same considerations apply to the proton.

Consider now what we called the exclusiveness of the electron or proton. Two electrons never fuse, nor two protons, nor even the electron and proton of the hydrogen atom, mutually attracting as they are. Thus do the charges show their individuation; each occupies its volume and will not suffer intrusion of another. And this is a positive attribute, since resistance is positive; for resistance changes the path of an impinging electron or proton. Now such an attribute can be construed in no way but as a mark of stuff. It does not hold of space; space knows nothing of resistance. It does not

hold of radiant energy. Waves of radiant energy pass through each other without the least mutual effect. The same place in the electromagnetic field may contain at the same time waves moving in opposite directions; but these waves are not material. Two material substances—electrons or protons—do not pass through each other. This property of preventing intrusion is peculiar to electrons and protons. We may conceive a three-dimensional figure moved along till it enters another figure; but a figure which at all points resists the entrance of another figure into its own volume is a volume filled with resistance. As above, stuff appeared as the binder-together of parts, so here it appears as the separator of volumes. Both characters taken together make up the individuality which is the positive mark of material stuff. Stuff is solid, internally continuous, and externally exclusive; and these attributes make up its atomic nature.

It is then the individuality of matter, or its property of being atomic, that renders matter substantial. Atomicity is the empirically verified difference between matter and space. Space has of itself no individuation and no discreteness. Different positions in space are identified always by reference to different bodies, which are systems of electrons and protons, or to isolated electrons and protons. The standard of reference may be the observer's own body or an external body. He may think of right or left, up or down, of remote or near places without material things in them, and he may conceive lines or planes independently of their content. But these are distinct only because he starts from his own body or other bodies; the lines are derived from some trace of chalk on a blackboard, or ink on a paper, and the planes are reflected light from the surface of a body. Ultimately, all spatial distinctions require something other than space to mark them out. This something else is discrete material stuff—a tautologous phrase indeed, since material stuff is stuff because it is discrete. There is no bare matter, but only this or that bit of matter maintaining itself against disruption and intrusion and acting on other bits by attraction and repulsion.

But one more step must be taken if we are to get the full meaning of stuff; a step to which we are led by a natural objection. Have we not, after all, done that very thing which we condemned at the outset as leading to absurdity? Have we not defined material substance wholly in relational terms: that which maintains itself *against* disruption and intrusion? Have we yet shown that it possesses anything in and by itself, over and above its reaction to what is outside it? In answer we point out the difference between substance as here defined, and charge. Charge is measured by the force of repulsion and attraction, and is wholly relative. Material substance

is not measured by any force. The only measure it has is its volume, and this is a measure of the space it occupies, not of the degree of the matter. If matter were measurable, it would be relative; and, indeed, the older conception of matter as being a mechanical mass did make it measurable. But, according to the electrical theory, mass is the pull of the field upon the electron, and the electron has no mass by itself. That the stuff which, as we claim, composes the electron has no measure, is seen in the fact that it is in a sense infinite. No body can be so massive, or move so fast, as to crush the ultimate atom. That atom has a greater capacity of resistance than is exercised at any moment you please. It contains an infinite potency of resistance, the major portion of which is always latent and hidden. Hence it is just to call stuff by the names "substance" and "substratum," which connote a concealed or underlying being; something never fully manifested. This concealed potency shows that substance is more than a relation to other substances, because the potency is never fully expressed in the relation to these. Material stuff has a content which, however much it is manifested in the actions and reactions to its surroundings, remains largely hidden. And thus it is something in and of itself.

It will be seen that the view of material substance here presented is a synthesis of several motives which have appeared in the history of the concept. We do not care to assign these to their proper sources, nor even to define them exactly; enough if we mention that we have included the notions of the latent, the independent, the subject of predicates, the permanent, and the individual. The key-notion is that of the individual: material substance or stuff is individual reality in the external world. Our view is thus monadistic, and pluralistic as far as it goes, but, of course, does not attempt to deal with the meaning of spiritual substance (if there be such a thing) or with ultimate monism. And, finally, it aims to justify the conservative attitude of common sense by showing that the refinements of scientific theory do not explode, but rather illuminate and confirm a category respected of old.

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BOOK REVIEWS

What is Truth? An Essay in the Theory of Knowledge. ARTHUR KENYON ROGERS. New Haven: Yale University Press. 1923. 184 pp.

Chapters I and IV consist, with numerous changes, of articles previously published in the *Philosophical Review* and this JOURNAL. The chapters entitled, "The Nature of Certainty," "The Nature of

Belief," "Knowledge of Other Selves and of the Past" (with the exception of the part on Memory), "Some Competing Theories," "Relations," "Some Metaphysical Implications," are new. The volume is intended to supplement Mr. Rogers' contribution to *Essays in Critical Realism*. Now that Mr. Santayana's supplementary volume has also appeared, *Sceptisism and Animal Faith,* one can scarcely resist the temptation to compare the two philosophies thus outlined. I shall leave that, however, to some more competent critic, and devote myself here merely to a criticism of Mr. Rogers's volume, as far as possible in his own terms.

The scope of the volume is considerably larger than the title indicates, but for purposes of review and criticism I shall select the problem indicated by the title because it is central and merely refer to the other problems raised. The problem of truth, here discussed, is not that of the metaphysical status of truth, but that of the conditions which are necessary for a belief or idea to be true.

There seem to me to be two fairly distinct theses developed with respect to the problem stated. The first might be summarized as follows: Truth is something which applies primarily to beliefs; a true belief is one which it is impossible to reject after critical inquiry; this impossibility is physical or practical rather than dialectical or logical, and grows out of the biological basis of human thought and action; the "critical inquiry" is necessary to justify the belief to the intellect and this justification uses as its criterion "coherence"; not coherence, however, in the sense of logical consistency, but of "consistency of fact or experience," by which is meant a "coincidence of evidence"; a belief which meets these conditions is accompanied by a "practical certainty," which is neither logical necessity nor self-evidence, but an "assurance that comes from the working together of numberless facts and satisfactions, and has in it an element both of faith and of intellectual justification, the blending of the two constituting reason. In the large, the faith is faith in ourselves—in the demands of our nature and the possibility of their satisfaction. This exists prior to the facts, because our life is organic before it is intellectual, and we can not in thinking eliminate ourselves" (p. 23). An analysis of belief (Chapter 3) serves to support this account, for it is there claimed that belief *in* the reality of an object is more primary than belief *that* a relation exists between two objects. This is to be expected, if belief has to do with tendencies to act, and with the "intellectual recognition of something that stands in relation to the process of active life."

This is apparently a straight-forward empirical answer to the question "What is truth?" and it might be expected to "justify" itself to any reasonable intellect; but here the trouble begins, for

there is Pontius Pilate on the one hand, and modern epistemologists on the other, who refuse to be satisfied. In fact, they seem to be agreed that the question must not be answered and by raising a few questions epistemologists make this account of truth seem almost childish, and embark the mind on a quest which leads it far away from the original "truth" and terminates, it seems, at the gates of heaven, where the mind may rest from its labors and abandon the troublesome animal body. These men ask, for example, Why should we believe that there are facts? What evidence is there for evidence? Suppose we are "critical" enough to abandon this animal "faith in ourselves," do not then all beliefs become illusory? It is evidently necessary to adopt entirely different tactics to explain truth to such minds, and to this task Mr. Rogers devotes himself in a second and quite different account of truth.

A true idea ("idea" seems to work better here than "belief," especially in view of what has already been said about belief) is now defined as one which "has itself the characteristics of the thing to which it professes to refer." The analysis may be summed up as follows. We have to deal with four things, according to Mr. Rogers, the objective and independent world of things and, in a sense, relations; the subjective entities or psychical states (sensations, feelings, images, *etc.*); the essences, meanings, ideas, qualities, characters, or descriptions; and lastly, some sort of activity. The world of objects and the psychical states are both existences, and as such never enter the knowing experience, for knowing takes place exclusively in terms of essences, meanings, or universals, which are not existences at all. On the other hand, it is of the essence of essences to refer to or belong to existences, and knowledge consists precisely in the ability to judge whether or not an essence or idea really belongs to the object which it intends. Such a situation seems to make truth and error possible but not discoverable. Mr. Rogers's way out of the old dilemma is fairly ingenious. The physical object and the sensation, both being existences, have their several essences, or their "ideal embodiments." Now these two existences can not be compared or in any way brought before the mind, but their respective essences can; and that is precisely what happens in "cognitive perception." If the two essences can be identified, if they "correspond or copy" each other, the idea is true. This correspondence, however, "is *discovered* not in the original act of knowing, which is a unitary act of reference or identification, but through a subsequent reflective thought, to which both the terms alike are on the side of their *existence* external; but also both object and mental state

alike are now present in *idea*, that is, in their essence, and so can be compared'' (p. 68). But, it may be objected, how does that get us any nearer the object itself? Well, it gets us as much nearer the object as the sensation is nearer to it than the essence. The sensation and the object, as any realist will admit, stand in existential (presumably causal) relations to each other and this connection is a primary fact in human experience not capable of, nor requiring, further demonstration. Now, if it could be shown that the relation between a sensation and its essence is more infallibly known than that between an object and its essence, our knowledge of the object would acquire the same certainty that our knowledge of our own psychic states or sensations enjoys, provided a correspondence can be observed between the two essences. The chapter on the ''Nature of Certainty'' is largely devoted to demonstrating that we *do* have this immediate knowledge of the essence of our own mental states, and that therefore this knowledge, and only this, has the quality of intuitive, self-evident truth. But at this point the old dilemma makes one feeble effort at resistance. If this mental state or sensation is an existence, either it has some specific content, in which case this content constitutes its essence in terms of which it is known, the existent itself thus eluding us, or it has no specific content, in which case, how can it possibly be an object of knowledge? To this question Mr. Rogers answers: ''the best I can do in way of reply is to say; I can not indeed mean it in the sense of having it as a specific meaning before my mind, comparable with red as red is comparable with blue. But I can *actively* mean it, point to it, locate it, have an anticipatory sense that I shall land in its immediacy. And I can do this because the mechanism of meaning, in this second and active sense, apart from all the differences of content that constitute 'meanings,' is *itself* also a real experience; and so the immediate sense of reality, though it never can be pictured or reduced to relationships, is always with me to irradiate with a feeling of significance my knowledge references to the real. And if we wish to make this explicit, we have only to stop for a moment to *give attention* to the present psychical field to have what may intelligibly be called a direct knowledge of existence, apart from the need of ideas to mediate it. For in the act of attention through which we bring into the center of the conscious field a present fact of relatively stable immediate experience, knowledge and being merge; we *are* what we know (attentively realize), and we know what at the moment we are'' (pp. 83–84).

In this summary I have used the case of knowledge of physical objects as illustration. Mr. Rogers, however, develops his thesis to

include knowledge of relations, of other selves, and of the past, which chapters I shall not attempt to review since they deal only indirectly with the problem of truth. He displays no little ingenuity in his attempts to show how the essences of our mental states can be identical with the essences of the various objects of knowledge, how, for example, the mental states involved in the perception of space have some of the characteristics which space itself has; how in memory the original experience is "ideally reinstated"; how a person who *knows* fear, must have embodied in his mental states some of the qualities of the man who is afraid, *etc.* He hastens to explain that the "total essence" of the mental state is here irrelevant. "It makes little difference what the image is like so long as it carries us ahead" (p. 74). "All that correspondence signifies is that any particular feature whose true nature we are to realize concretely must be 'embodied' in a psychical state, whatever the total description of that state may be" (p. 75).

The whole argument, as I have intimated, seems to me to be written only for epistemologists and "literary psychologists" (to borrow Mr. Santayana's phrase) and I trust it represents a substantial contribution toward the solution of the difficult problems which these scientists have set for themselves. Other readers must learn what they can about the truth from this part of the book. The author himself is certainly not bound by his own dialectics for although he is presumably much concerned with the truth about truth in this volume, and although he attempts a detailed analysis of the essence of truth, yet nowhere does he, so far as I can see, trouble himself to discover a correspondence between this essence and the essence of whatever mental state the truth may inspire in him. Partly for this reason, partly for reasons I shall now give, it does not seem to me that this piece of clever dialectics has the empirical basis which it is supposed to have.

At critical points in this argument the author resorts to tactics, which, if carried further, might have saved him (so it seems to me) much epistemological struggling and invention; I mean his falling back on the empirical method, on the appeal to the world of action and of life. It may have been noticed that the fourth item in the catalogue of realities with which this argument is introduced, namely, the realm of activity, plays the modest rôle of "pinch hitter." "If "activity" had been followed out to its implications with the same rigor and care which were applied to essences, the results might have been more significant, and what I have called the author's second account of truth might have had more intrinsic connection with his first. The author's theoretic reason for abandoning the world of action in the analysis of knowledge seems

to be that the contact which the human organism has with the objective world, except through sense perceptions, is very vague and ill-defined. This follows naturally from the old tradition which places all "specific content" and definite meaning in the qualities of sense perception and regards them as essences or some other sort of accompaniment of mental states. But a "critical realist" who belongs to a group which has done much to disentangle the confusion between mental states and essences, and especially in a volume which undertakes a critical analysis of this very tradition, might be excepted to be more critical at this point. He makes the point repeatedly that when we "react to the world" we merely "recognize reality in general," and that for purposes of knowledge reality must be "clothed with certain specific features." And he continues: "We can not characterize existence except in experienced terms, which means in terms of the essences of our experienced psychical feelings" (p. 66). Now this seems to me an old superstition which is here accepted uncritically. I wish to suggest that we seldom react to the world in general, that activity is as specific as anything can be and that the qualitative differences which consitute the world of essences or meanings might very well be described in terms of "reaction patterns" instead of "psychical feelings." The most that Mr. Rogers yields in this direction is in the passage quoted above at length. He is there forced to admit that in the case of the meaning of the existence of a mental state, "I can *actively* mean it, point to it, locate it, have an anticipatory sense that I shall land in its immediacy. And I can do this because the mechanism of meaning, in this second and active sense, apart from all the differences of content that constitute 'meanings,' is *itself* also a real experience." It seems to me that a "mechanism" which can "locate" a "psychical feeling" is almost delicate enough for any job of knowing. Certainly to admit this much of the physical mechanisms of the human organism makes it at least desirable to examine more carefully, the limits of "specificity" of this type of meaning. I can see no reason why it might not be possible to analyze as specific a character as you please into a system of reactions; in fact it is a very plausible hypothesis and quite in line with the realistic tendency in recent thought to maintain that whatever is objective, communicable, a basis for human intercourse and mutual understanding, in human experience is in the last analysis constituted of reaction-patterns, forms of behavior, or whatever other name one may choose to give them, and that the essentially private, incommunicable element in human experience is to be found in the intrinsic qualities of our sensations and feelings. Certainly *knowledge* is to be sought in the former realm. To

approach the problem of knowledge *via* the immediate *feel* or *quale* of acts of sense perception seems necessarily the least promising, unless, as one often suspects, the aim of the inquiry is to make knowledge something inner and private. To have a sensation is certainly something quite different from knowing it; this is admitted by Mr. Rogers. But what force would such a distinction have, if the having and knowing always go together? Then what is gained by trying to get knowledge out of *having* the sensation *again?* The following passage may illustrate what seems to me a confusion of this sort: "Suppose I am trying to think truly the character of a previous sense experience of redness. Unless I can call up an image whose redness is equivalent to the previously experienced redness, or can get a new sensation of the same kind, to that extent I fail to have any realizing sense of its qualitative nature, in the state of mind in which I am just, as we say, 'thinking about it,' though the defective image may still serve the purpose of directing me in the sort of conduct for which the object calls. Or if I try to 'think' another man's feeling of fear, I only succeed in knowing the qualitative 'fear' essence in so far as I am able to use, directly or indirectly, in 'knowing' it, a similar concrete experience of my own, which embodies in itself the same quality I need to have before my mind if I am to attribute it to another" (p. 73). What empirical reason is there for claiming that one has to *see* red to *know* red, or that one must to a degree *be* afraid in order to *know* fear? To be sure, I may not have a "realizing sense of its qualitative nature," if I *have never been* afraid or *have never seen* red, or even if I am unable to "reinstate" the former experience, but I certainly can "think about" them, to say nothing of knowing what they mean, without reinstating them, and if I do reinstate them, that does not insure my knowing them any more than the first time I had the experience. Thus to assume that the *having* of a "realizing sense of its qualitative nature" is the basis of its usefulness, its carrying power, or its "directing me in the sort of conduct for which the object calls," is an illustration of the old confusion between being and knowing, perception and knowledge, between the private and the public, the subjective and the objective in human experience. The source of the confusion, in this passage at least, seems to be the fact that the author, forgetting his realism, tends to regard the "qualitative essence" as both the *object* and the *means* (instrument) of knowledge.

To approach knowledge from an objective and active point of view seems much more hopeful and would certainly be more consistent with the first part of this volume. It might actually solve the problem of *knowledge* (*horribile dictu*) without mentioning

psychical feelings and perception. Perception and allied psychological problems might then likewise be discussed in their own terms. Such an approach would ascribe to the world of action, which is admittedly primary, a more important function than that of "irradiating with a feeling of significance my knowledge references to the real." Surely there are sufficient reasons, empirical, dialectical, and social, for attempting to make a clearer distinction between the problems of knowledge and of consciousness, of cognition and of perception, of meaning and of feeling. Realism has certainly made a significant contribution in this direction, and that is why the first part of the volume raises hopes which are doomed to disappointment.

The reasons for the gradual submerging of the empirical strain in the course of the argument of the volume seem to be two. First, an uncritical acceptance of tradition as though it represented the facts of human experience (of this I have already said enough); secondly, an interest in an epistemological proof for the possible existence of God. I do not know whether I ought to emphasize this, for Mr. Rogers is himself very apologetic about it. Suffice it to say that it is intimated as the chief of the "metaphysical implications" of this analysis that it is possible that just as our mental states embody essences, so the essences which we (at least we "critical realists") attribute to natural objects might possibly be embodied in the mental life of some superhuman but finite self. "And if the reality of the physical world be the life of God himself, then we might be led to conjecture that the reality of the deeper self may lie directly in the depths of the divine. I am inclined to think that religion would find itself sympathetic with such a view, if, again, we do not press too far for a detailed statement" (pp. 169–170). It is important to note that God is not necessary to guarantee truth; all that is claimed is that the truth does not make God impossible. The analogy on which the argument for God is based is entirely dependent on the argument for the cognitive value of the essences of our mental states, and it may be that the author's preoccupation with this point means that he is more interested in this "metaphysical implication" than the volume itself entitles one to believe.

Certain passages of the book are best explained on the supposition that the author has a sense of humor; this is especially true of his discussion of the "problem of the existence of existence," which is really very amusing. Then, too, the book has a subtle excellence from the dramatic point of view. The seemingly innocent question: What is Truth? is squarely approached at first and yields quite willingly, but a little skepticism about reality serves to draw at-

tention from the main question until the reader is almost imperceptibly carried away from truths to certainties, from certainties to beliefs, from beliefs to ideas, from ideas to essences, from essences to feelings, from feelings to the self, from the self to other selves, and thence on to space, to time, and ultimately to God, where all questions vanish in the divine wonder. Meantime Pontius Pilate smiles at the philosophers whom his little question has so captivated that they lose sight of the fact that out in the busy, external world truth is being crucified.

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JOURNALS AND NEW BOOKS

PSYCHOLOGICAL REVIEW. Vol. 30, No. 5. The Behavioristic Interpretation of Consciousness, II: *K. S. Lashley.* The Stimulus-Response Fallacy in Psychology: *L. L. Thurstone.* The Organic Setting of the Problem of Thinking: *J. A. Melrose.* Cattle, and Excitement from Blood: *G. M. Stratton.* A Comparison of the Intelligence of Mexican and Mixed and Full Blood Indian Children: *T. R. Garth.*

Hobson, E. W.: The Domain of Natural Science. (The Gifford Lectures Delivered in the University of Aberdeen in 1921 and 1922.) New York: Macmillan Co. 1923. xvi + 510 pp. $6.50.

NOTES AND NEWS

We have received from Paris the *Bulletin de L'Institut Général Psychologique,* 23e Année, Nos. 1–3, which contains the following articles:

GROUPE D'ÉTUDE DE PSYCHOLOGIE INDIVIDUELLE—Réflexions d'un biologiste sur l'objet et les limites de la Psychologie: *R. Anthony;* La pensée humaine, ses origines, sa naissance, son évolution, sa fin: *E. Bernard;* Sur une sensibilité nouvelle du tact: *C. Henry.* Expériences sur une sensibilité nouvelle du tact: *J. Courtier.*

GROUPE D'ÉTUDES DES RECHERCHES PSYCHIQUES ET PHYSIOLOGIQUES—Rapport du psychisme et de la vie organo-végétative: *A. Guillaume;* L'action de la main sur l'être vivant (Étude de Methode): I. Expériences de recherche—II. Hypothèses interprétatives provisoires: *L. Favre.*

La Théorie de la Relativité et la Psycho-biologie scientifique: *C. Henry.*